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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/561,761	12/21/2005	Didier Pribat	19320-004US1 QT FR04/0163	1628

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EXAMINER	
CORNO JR, JAMES A	

ART UNIT	PAPER NUMBER
4162	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/561,761	PRIBAT, DIDIER	
	Examiner	Art Unit	
	JAMES CORNO	4162	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 May 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 December 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5/19/2006 and 3/15/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

The abstract of the disclosure is objected to because of an incorrect reference to the drawings. On line 9, “carbon nanotubes (6)" should be replaced with "carbon nanotubes (8)". Correction is required. See MPEP § 608.01(b).

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character “4” has been used to designate both metal studs to be annealed to form seed particles and metal layers to be stripped away before annealing (see figure 8 (a'''_2)). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 11 and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 11 recites the limitation "the thin film" in step (a'''$_1$). There is insufficient antecedent basis for this limitation in the claim.

Claim 12 recites the limitation "a second crystalline material" in the last line of the claim. There is insufficient antecedent basis for this limitation in the claim. Applicant may specify a first crystalline material or amend this limitation to read “a second, crystalline material”.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 4, 7, 8, 11, and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Guillorn, et al. (US 2004/0069994). Guillorn teaches a process in which

carbon nanotubes are grown from catalyst seeds on a substrate, after which a second material is used to coat the substrate, completely covering the nanotube (see Example 1 of the specification, paragraphs 63-73). Guilliorn does not teach a monocrystalline region of the second material oriented from a seed. However, this is understood to be a natural consequence of depositing a material on the seeds by CVD.

Regarding claim 4, Guillorn teaches the use of a nickel catalyst.

Regarding claims 7, 8, and 11, Guillorn teaches a lithography process to leave thin nickel studs on the substrate, after which the substrate and nickel are annealed to produce catalyst seeds.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Guillorn as applied to claim 1 above, and further in view of Awano, et al. (US 2003/0124717). Guillorn does not teach the seed formation process of claim 9. However, Awano teaches a process of implanting metal ions in a substrate, annealing the substrate to form metal particles of a desired size, and stripping away the substrate to expose the particles as seeds for carbon nanotube growth (paragraph 68). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate this method in order to control the size and spacing of the seed particles.

Claims 2, 10, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guillorn as applied to claims 1, 7, and 8 above, respectively, and further in view of Empedocles, et al. (US 2004/0005723). Guillorn does not teach the use of a magnetic field. However, Empedocles teaches the use of a magnetic field to control the orientation of the seed particles and nanotube growth. It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate this method in order to control subsequent crystallization of the deposited material.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Guillorn and Awano as applied to claim 9 above, and further in view of Empedocles. Guillorn does not teach the use of a magnetic field. However, Empedocles teaches the use of a magnetic field to control the orientation of the seed particles and nanotube growth. It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate this method in order to control subsequent crystallization of the deposited material.

Claims 1, 3, 5, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Voutsas (U.S. Patent No. 5,959,314) in view of Audier (*J.Crystal Growth* **55**, pp. 549-556, 1981) and Guillorn. Voutsas teaches the growth of a large-grained, polycrystalline silicon film on a glass substrate (col. 4, lines 48-50) by depositing amorphous silicon seeded with crystallites of a predetermined orientation (col. 8, lines 42-45) and annealing. Voutsas does not disclose the use of carbon nanotubes to support the seed crystals. However, Audier established that the orientation of seed particles on carbon nanotubes is controlled by the nanotubes, and Guillorn teaches the nanotube fabrication methods of claim 1, as shown above, with the intention of coating the nanotubes and seeds. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the nanotube/seed combination as the crystallites of predetermined orientation described by Voutsas.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAMES CORNO whose telephone number is (571)270-5829. The examiner can normally be reached on Monday-Thursday 9:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached at 571-272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JAMES CORNO/
Examiner, Art Unit 4162

/Jennifer McNeil/

Supervisory Patent Examiner, Art Unit 4162